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Efficacy of Neem Products against *Alternaria alternata* a Seed Mycoflora of Chilli

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Abstract

Five neem products viz., achook, neemgold, neemta, repelin and neem oil were tested *in vitro* at 0.5, 1.0, 2.0 and 5.0% concentrations against *Alternaria alternata* (Fr.) Keissler, a seed-borne pathogen causing fruit rot disease in chilli (*Capsicum annuum* L.). All the products were significantly superior over check in reducing the mycelial growth and differences among them were statistically significant. Among these products neemta appeared to be the best followed by neem oil, neemgold, repelin and achook, as the reduction in mycelial growth, was brought down by the different concentration upto 15 days of incubation. Concentrations of all the fungitoxicants had significant effect on the growth of *A. alternata.* The growth of mycelium and germination of spores was not completely checked by any one of the products at any concentrations exposed. The germination of spores was highly inhibited by achook followed by neemta, neemgold, neem oil and repelin.

Key words : ***Capsicum annuum, Alternaria alternata, Azadirachta indica.***

Chilli (*Capsicum annuum* L.) is one of the important commercial spices crop and India is rated to be the second largest exporter of chillies in the world. Chilli is attacked by several pathogens both in the pre-harvest and post-harvest phases. Seed mycoflora of chilli has profound influence on seed quality, rate of germination and yield (Suryanarayana and Bhombe 1961, Quebral and Shrutlef 1965). The indiscriminate use of chemicals may lead to development of resistant strains in the pathogen. These ill effect of synthetic pesticides have aroused interest in alternate method for combating plant diseases. The present study, therefore, was undertaken to observes the effect of neem (*Azadirachta indica* Juss.) products on the mycelial growth and spore germination of *Alternaria alternata* (Fr.) Keissler, a seed brone pathogen causing fruit rot disease in chilli.

Methods

Inhibitory effect of various neem products viz., achook, neemgold, neemta, repelin and neem oil were tested in *in vitro* at concentrations of 0.5, 1.0,2.0 and 5.0% against *A. alternata*. The stock solution of neem products were prepared in sterilized distilled water. Poison food technique (Schmitz 1930) was adopted for mycelial growth and spore germination. Respective doses of test materials were incorporated in 100 ml melted potato dextrose agar (PDA) medium, maintained in 250 ml Erlenmeyer flask, after sterilization. Four replication of each treatment were maintained. Measured 20 ml medium was poured in each of four petridished per treatment. Check was maintained by pouring PDA without mixing neem products in it. Each plate was incubated with 10 mm mycelial disc of eight days old culture of test fungus and incubated at 25 ± 2C. The diameter of mycelial growth was measured at interval of 5 days.

One ml of spore suspension (3×10^3/ml) prepared from a 8-day old culture was added to each conical flask containing 10 ml of 0.5, 1.0, 2.0 and 5.0% of neem products. After thorough mixing, one drop of each suspension having spore was mounted on glass slides kept in petridishes having moist blotting paper to maintain the humidity. The petridishes were incubated at 25± 2C. The spore suspension without neem product served as control. The number of germinated and ungerminated spores were counted after 24 hours of incubation. The experiment was conducted thrice with four replications.

Results and Discussion

Table 1 shows that all the neem products were highly effective against *A. alternata* in reducing the

Table 1. Effects of neem products on mycelial growth (mm) of *Alternaria alternata.*

Fungi-toxi-cants	Colony diameter in mm Concentration (%) 5 days 0.5	1.0	2.0	5.0	Mean	10 days 0.5	1.0	2.0	5.0	Mean	15 days 0.5	1.0	2.0	5.0	Mean
Achook	22.00	16.50	7.75	5.75	13.00	34.75	22.50	16.50	13.75	21.88	54.50	49.75	45.50	40.25	47.50
Neemgold	10.00	7.75	6.50	2.75	6.50	22.50	18.25	13.50	7.50	15.44	46.00	37.50	33.50	24.00	35.25
Neemta	5.50	4.00	3.25	2.00	3.69	17.50	14.75	9.50	5.50	11.81	44.25	35.50	28.00	21.50	32.31
Repelin	11.50	8.50	6.50	5.00	7.88	24.00	18.75	14.50	8.00	16.31	46.50	41.50	38.75	32.50	39.81
Neem oil	6.25	4.75	3.50	2.25	4.19	18.25	15.50	10.50	6.00	12.56	45.50	35.00	28.25	22.50	32.81
Control	30.00	30.00	30.00	30.00	30.00	44.00	44.00	44.00	44.00	44.00	85.00	85.00	85.00	85.00	85.00
Mean	14.20	11.92	9.58	7.96		26.83	22.29	18.08	14.13		53.63	47.38	43.17	37.63	
						SE ±				SE ±			SE ±		
Concentration CD (0.01)				0.65		0.17		1.39		0.36		1.48	0.39		
Fungitoxicants CD (0.01)				0.79		0.21		1.71		0.45		1.81	0.47		
F × C CD (0.01)					1.59		0.41		3.41		0.89		3.62	0.95	
CV				6.6				7.6				3.6			

mycelial growth even at low concentration (0.5%). The reduction in fungal growth at various concentrations of different products was significant over the control, however, none was able to check the growth and spore germination completely. Neemta appeared to be the best in reduction of mycelial growth which was brought down by the different concentrations upto 15 days of inoculations. Increasing concentrations of different neem products significantly reduced the mycelial growth. The interaction between neem products and incubation periods also showed significant effect on mycelial growth of pathogen. The products showed maximum inhibitory effect on mycelial growth upto day 5 of incubation and gradually reduced with the extension of incubation period. The fungal growth became maximum at day 15 of incubation. This result indicates probably quick degradation of neem products.

At day 5 of incubation minimum mycelial growth was observed in neemta (2.0 mm) followed by neem oil (2.25 mm) and repelin (2.75 mm). Achook was least effective to check the mycelial growth and had maximum fungal growth 5.75, 13.75, 40.25 mm at days 5, 10 and 15 of incubation, respectively.

In the interaction of neem products, their doses and incubation periods, the efficacy in inhibition of mycelial growth at different concentrations of each products significantly reduced the prolongation of

Table 2. Effects of neem products on the germination of spores of *Alternaria alternata.*

Fungi toxicants	Spore germination Concentration (%) 0.5	1.0	2.0	5.0	Mean
Achook	92.30	89.00	78.60	65.10	81.25
Neemgold	92.60	91.25	80.50	72.40	84.18
Neemta	92.50	90.20	80.00	71.90	83.65
Repelin	93.40	92.00	84.20	80.50	87.53
Neem oil	92.90	91.50	83.00	72.20	84.90
Control	98.60	98.60	98.60	98.60	98.60
Mean	93.72	92.09	84.15	76.78	98.60
				SE ±	
Concentration CD (0.01)		1.25		0.327	
Fungitoxicants CD (0.01)		1.53		0.400	
F × C CD (0.01)		3.06		0.801	
CV		1.6			

incubation periods. Neemta and neem oil were highly effective at 5% upto day 5 of incubation, exhibited only 2.0 and 2.25 mm of mycelial growth. The maximum mycelial growth (5.75 mm) was recorded in achook at same period of incubation prove to be the least effective against the pathgoen. After 15 days of incubation, neemta and neem oil had little higher inhibitory effect showed 21.5 and 22.0 mm mycelial growth in compared to achook (40.25 mm). These results indicate slightly better retention capacity of inhibiton properties in neemta and neem oil than achook.

Table 2 shows that all the neem products reduced the spore germination significantly over control with increasing their doses. These products differed significantly in their efficacy with respect to inhibition of spore germination. However, neemta and neem gold showed more or less similar results. Achook was found to be the best showing minimum germination (81.86%) followed by neemta, neemgold, neem oil and repelin. The germination of spore significantly decreased with the increase in concentration of each products except at 0.5 and 1.0 % of achook, neemgold and neemta which were at par with each other. Singh et al. (2003) tested six neem products *in vitro* at different concentrations against *A. triticina*. Among these nimin gave better response in respect to inhibiting the growth of *A. triticina* followed by neemgold and nimbicidine. Babu et al. (2001) and Jitendra and Majumdar (2001) also reported similar antifungal properties of neem against several fungi including *Alternaria* spp.

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